

REMARKS

Please reconsider the application in view of the above amendments and the following remarks.

Disposition of Claims

Claims 1-20 are pending in this application. Claims 7, 9, 10, 13, 14, and 16-18 have been withdrawn from consideration but are left pending as these claims may be examined if a generic claim is found to be allowable. Claims 1, 2, 11, 19, and 20 have been amended. Claims 1, 19, and 20 are independent. The remaining claims depend, directly or indirectly, from claim 1.

Amendments to claims 1, 2, 11, 19, and 20 are fully supported by the original specification and therefore no new matter has been added. Amendments to claims 2 and 11 are not made in view of prior art, but are solely made to correct formalities and to clarify the recitation of the invention.

Regarding the withdrawal of claim 15 as shown in the Office Action Summary, it is noted that claim 15 has not been withdrawn from consideration as stated in the claim listing included with our reply dated January 9, 2004.

Further, Applicants respectfully request the references, as listed in the Information Disclosure Statement filed together with the application on July 30, 2003, be acknowledged as considered by initialing the PTO-1449 forms and forwarding them to the undersigned.

Objection(s)

Claim 2 is objected to because the phrase “terminal by electric” should be corrected as --terminal by an electric power supply--. Claim 2 has been amended accordingly. Thus, this objection is now moot.

Rejection(s) under 35 U.S.C § 112

Claim 11 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regards as their invention because it is not clear what is meant by “part” and “another part”. Claim 11 has been amended to state that “the moving section comprises at least one narrower part including the first terminal.” Thus, this objection is now moot.

Rejection(s) under 35 U.S.C § 102

Claims 1-3, 5, 12 and 19 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,619,177 (“Johnson *et al.*”). To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

The present invention relates to switches for electrically connecting a first terminal with a second terminal. According to an embodiment of the invention, one of the switch include a first terminal and a second terminal confronting the first terminal; driving means for driving the first terminal in the direction of the second terminal; and an electrostatic coupling section including a first electrode and a second electrode

confronting each other for attracting the first terminal in the direction of the second terminal by electrostatic force. The electrostatic coupling section is located closer, than the first terminal, to a free end of the driving means.

More specifically, as described in amended claim 1, a switch for electrically connecting a first terminal with a second terminal confronting the first terminal. The switch includes a driving mean having a fixed end and a free end in a longitudinal direction for driving said first terminal in the direction of said second terminal; and an electrostatic coupling section including a first electrode and a second electrode confronting each other for attracting said first terminal in the direction of said second terminal by electrostatic force, said electrostatic coupling section being disposed closer to said free end of said driving mean than a location of the first terminal.

Amended claim 19 describes a switch for electrically connecting a first terminal with a second terminal confronting the first terminal. The switch includes a driving mean having a fixed end and a free end in a longitudinal direction for driving said first terminal in the direction opposite to said second terminal; and an electrostatic coupling section including a first electrode and a second electrode confronting each other for attracting said first terminal in the direction of said second terminal by electrostatic force, said electrostatic coupling section being disposed closer to said free end of said driving mean than a location of the first terminal. Claim 20 describes an integrated circuit device including a plurality of switches as described in claim 1.

In contrast, Johnson *et al.* describes a microactuator for use as an electric control. The microactuator includes an actuator member carried at its proximal end by a base. A layer of charge-carrying material is formed on the upper surface of the base. The actuator

member is comprised of a composite beam having a shape change layer bonded on its lower surface to an elastic substrate. The substrate is comprised of a Si layer and a SiO sublayer. A layer of charge-carrying material is formed along the lower surface of the Si layer. An electrical contact is embedded in the free end of the actuator member, and another electrical contact is embedded in the upper surface of base at a position which registers with the upper contact. (See Column 7, lines 36-59.) Furthermore, as shown in figure 5, the electric contact is located at the free end of the actuator member and the electrostatic coupling is located between the fixed end of the actuator member and the electric contact.

On the contrary, according to the invention, the electrostatic coupling is closer to a free end of the driving mean than the electric contact (the first terminal) is to that free end.

In view of the above, Johnson *et al.* fails to show or suggest the present invention as recited in the claims as amended. Therefore, claim 1, 19 and 20 are patentable over Johnson *et al.* Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 103

Claims 4 and 6 stand rejected under 35 U.S.C. § 103(a) as obvious over Johnson *et al.* in view of Loo *et al.* (U.S. Patent No. 6,046,659.) The applicant respectfully traverses this rejection.

For at least the same reasons as discussed above, Johnson *et al.* fails to disclose or suggest the claimed invention as recited in claims 4 and 6. Like Johnson *et al.*, Loo *et al.* also fails to disclose or suggest all the limitations recited in claims 4 and 6, and fails to provide that which Johnson *et al.* lacks.

Loo *et al.* describes a micro-electro-mechanical (MEM) switch. Referring to figure 1A, one end of an armature 16 is affixed to a substrate 14 near an output line 18 on the substrate 14. The free end of the armature 16, including a conducting dimple 24, is positioned over an input line 20. A substrate bias electrode 22 is printed on the substrate 14 below the center of the armature 16. The armature 16 is electrically isolated from the substrate bias electrode 22 by an air gap. A conducting dimple 24 protrudes from the armature 16 toward the input line 20. A conducting line 28 (shown in FIG. 2) is printed on the armature 16 and electrically connects the dimple 24 to the output line 18. When the MEM switch 10 is in an open position, the dimple 24 is electrically isolated from the input line 20 by an air gap. When a voltage is applied between the suspended armature bias electrode 30 and the substrate bias electrode 22, an electrostatic attractive force will pull the suspended armature bias electrode 30 as well as the attached armature 16 towards the substrate bias electrode 22, and the contact dimple 24 touches the input line 20. Loo *et al.* is silent regarding providing the electrostatic coupling at the free end of the

armature 16. As said before, in Johnson *et al.* the electrical contact is embedded in the distal end (the free end) of the actuator member.

On the contrary, according to the invention, the electrostatic coupling is closer to a free end of the driving mean than the electric contact (the first terminal) is to that free end.

Thus, the amended claims 1 and 19, and claim 20 are patentable over Johnson *et al.* and Loo *et al.*, whether considered separately or in combination. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as obvious over Johnson *et al.* in view of Hopcroft (U.S. Patent No. 6,621,387). The applicant respectfully traverses this rejection.

For at least the same reasons as discussed above, Johnson *et al.* fails to disclose or suggest the claimed invention as recited in claim 8. Like Johnson *et al.*, Hopcraft also fails to disclose or suggest all the limitations recited in claim 8, and fails to provide that which Johnson *et al.* lacks.

Hopcroft describes a switching mechanism that consists of two bridges suspended above a transmission line. Both bridges have their two ends fixed to a substrate. The bridges have contacts on their sides oriented toward the transmission line which will either close the gap in the transmission path or shunt the signal to the ground planes. The bridges are operated by electrostatic actuation. When a bias voltage is applied to the bridge actuation electrodes, the bridge experiences an attractive electrostatic force between the electrodes and the ground planes, causing the bridge to deflect so that the

contact on the bridge touches the transmission line. Hopcroft *et al.* is silent regarding providing a switch which includes an actuator having a fixed end and a free end. As said before, Hopcroft provides an actuating member (the bridges) with both of their ends fixed to the substrate.

On the contrary, according to the invention, the electrostatic coupling is closer to a free end of the driving mean than the electric contact (the first terminal) is to that free end.

Thus, the amended claims 1 and 19, and claim 20 are patentable over Johnson *et al.* and Hopcroft, whether considered separately or in combination. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as obvious over Johnson *et al.* in view of Minners (U.S. Patent No. 6,236,300.) The applicant respectfully traverses this rejection.

For at least the same reasons as discussed above, Johnson *et al.* fails to disclose or suggest the claimed invention as recited in claim 11. Like Johnson *et al.*, Minners also fails to disclose or suggest all the limitations recited in claim 11, and fails to provide that which Johnson *et al.* lacks.

Minners describes a bistable switch including a substrate having at least one power source; a flexible sheet having a first distal end attached to the substrate; a bridge contact formed at the free end and opposite distal end of the flexible sheet; and at least one heat activated element connected to a first surface of the flexible sheet and between the second distal end and the power source. During operation, current from the power

source passing through the heat activated element indirectly bends the flexible sheet and short the signal contacts on the substrate with a sustainable force. Minners is silent regarding providing a switch which includes an electrostatic coupling mechanism to maintain the switch in a closed position. As said before, in Minners a bridge contact is formed at the free end of the flexible sheet.

On the contrary, according to the invention, the electrostatic coupling is closer to a free end of the driving mean than the electric contact (the first terminal) is to that free end.

Thus, the amended claims 1 and 19, and claim 20 are patentable over Johnson *et al.* and Minners, whether considered separately or in combination. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 20 stands rejected under 35 U.S.C. § 103(a) as obvious over Johnson *et al.* in view of Buck *et al.* (U.S. Patent No. 5,268,696.) The applicant respectfully traverses this rejection.

For at least the same reasons as discussed above, Johnson *et al.* fails to disclose or suggest the claimed invention as recited in claim 20. Like Johnson *et al.*, Buck *et al.* also fails to disclose or suggest all the limitations recited in claim 20, and fails to provide that which Johnson *et al.* lacks.

Buck *et al.* describes a phase shifter including means for shorting a slotline to vary the length of the slotline to a fraction of its predetermined length as measured from the open radiating end portion to the means for shorting to reflect electromagnetic energy. As shown in figure 2, a electrostatic switch 8 spanning over the slotline 14 includes a

cantilever element 24 is secured to the top surface 12 of the conductive layer 6 at a first end portion 26 and free to move at the opposite second end portion 28. Under the free second end portion 28 of the cantilever element 24, and connected to the dielectric substrate 4, is a pull down electrode 30. Additionally, under the free second end portion 28 of the cantilever element 24, and mounted to the top surface 12 of the conductive layer 6, is a contact pad 32 which is located between the attached first end portion 26 of the cantilever element 24 and the pull down electrode 30.

The contact pad 32 is closer than the pull down electrode 30 to the cantilever element 24. Electrical contact is made with the fixed first end portion 26 of the cantilever element 24 and with the pull down electrode 30, resulting in an electrostatic charge being selectively applied to the two elements by a means for selectively actuating 10 the electrostatic switch 8. The free second end portion 28 of the cantilever element 24 and the pull down electrode 30 are drawn towards one another by the electrostatic force of the charge applied to the two elements.

The pull down electrode 30 is attached to the dielectric substrate 4 and the free second end portion 28 of the cantilever element 24 is free to move, thus only the cantilever 24 free second end portion 28 is deflected towards the pull down electrode 30. The cantilever element 24 deflects until it contacts the contact pad 32. The cantilever element 24 does not come into contact with the pull down electrode 30. Buck et al. is silent regarding providing a switch for connecting a first electrical terminal with a second electrical terminal as well as the inclusion of a driving mean, in addition to an electrostatic coupling, for driving the first terminal in the direction or opposite to the second terminal. As explained before, the cantilever element is driven exclusively via the

electrode 30 and its function is to shorten the travel distance of electromagnetic waves, not to close an electric circuit.

Moreover, Buck *et al.* does not belong to the field of the invention and is not pertinent to the problem that the invention tries to solve. In fact, Buck *et al.* relates to the art of electromagnetic energy sources and is concerned with providing a phase shifter which is small, inexpensive, faster, and requires less power consumption. The invention is related to electric switches and integrated circuits including the electric switches. Therefore, Buck *et al.* cannot be properly cited as prior art to the claimed invention.

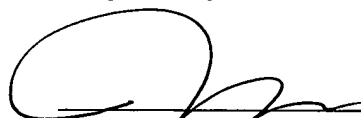
Thus, the amended claims 1 and 19, and claim 20 are patentable over Johnson *et al.* and Buck *et al.*, whether considered separately or in combination. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 02008/119001).

Respectfully submitted,

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Jonathan P. Osha, Reg. No. 33,986
Osha & May
1221 McKinney, Suite 2800
Houston, TX 77010
Telephone: (713) 228-8600
Facsimile: (713) 228-8778

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